

ANALYSIS OF FRUIT AND VEGETABLE VALUE CHAINS

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Summary

Agricultural products are bought for personal consumption or for further production.

Fruit and vegetables are an important sector of agricultural production in Bosnia and Herzegovina, as they ensure population food sufficiency as well as income for rural farms. In Bosnia and Herzegovina, the market supply chain of fruit and vegetables is short, which means that the products are sold near the production site or at local markets. Longer market chains are largely not represented because the producers remain passive and have no contractual relationship with wholesalers and retailers.

The main objective of the paper is to identify and analyze the production and sales sectors of fruit and vegetables in B&H, as well as to improve the market supply chain through the proposed application of modern management methods. The data in this research were collected through a survey of agricultural producers (primary sources of information) as well as by conducting an analysis of secondary data sources (scientific and professional literature, data of official statistics). The following research methods were used: survey method, descriptive method, methods of analysis and synthesis, method of comparison.

As a challenge in managing and establishing a more efficient market chain, the question arises of how to include small producers into the modern market chain.

Key words: *fruit and vegetables production, value chain, supply chain, distribution of fruit and vegetables.*

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1. INTRODUCTION

Fruit and vegetables occupy an important place in the agriculture of Bosnia and Herzegovina and have a major role in ensuring food security and nutrition for a wide segment of the population.

Competitive advantages of fruit and vegetables in Bosnia and Herzegovina are reflected in the low level of farmers' revenue, i.e. low labor costs in agricultural production. Farmers' revenues are much lower when compared to the farmers in the environmental countries and the member states of the European Union. In such a situation, a positive shift could be expected in developing fruit and vegetable production in Bosnia and Herzegovina. The motive and aspiration of the farmers in Bosnia and Herzegovina should be an increase in revenues from the production of fruits and vegetables.

High level of duality, with a small proportion of medium-developed producers, together with low income and short supply chain are the basic characteristics of the fruit and vegetable sector in Bosnia and Herzegovina.

High duality is reflected in the fact that on the one hand there are a lot of small fruit and vegetable producers who produce for their own needs, and on the other hand there are the market-oriented producers and companies that can be competitive because of the size of their farms, knowledge, possession of machinery and equipment. The middle market-oriented producers (2-10 ha), which frequently provide the backbone for development of fruit and vegetable production, are underrepresented.

The production of fruit and vegetables is the key agricultural activity, and it has an important economic role in many countries. In the EU (EU 27), the fruit and vegetable production accounts for 18% of agricultural production, and it is evenly divided between fruit production and vegetable production (Petriccione et al., 2011) quoted in (Tatry et al., 2014, p. 2208). Within the EU, a special place in the production of fruit and vegetables is occupied by Greece, Spain and Italy with a 25-35% share in production (Camanzi, L. et al., 2011.)

Production of fruits and vegetables is one of the most important agricultural sectors of Bosnia and Herzegovina. In the last few years, this sector has achieved a large increase in production, especially in the sub-sector of berry fruits. An increase in fruit and vegetable production in recent years is the result of significant investments on the territory of Bosnia and Herzegovina (USAID/Sida FARMA and et., 2014a, p. 6).

Production of fruit and vegetables in each country, as well as in Bosnia and Herzegovina, is important because, in addition to providing food security, it generates income for the rural farms. The fruit and vegetable production requires human labor, farming technology, high-quality agricultural land, as well as machinery and equipment. The paper gives an overview of fruit and vegetable production with basic characteristics of the fruit and vegetable producers in Bosnia and Herzegovina. In addition, it also discusses the importance and specific characteristics of the fruit and vegetables value chain as well as the supply chain that is characteristic for Bosnia and Herzegovina. In the last section of the paper it presents the stone fruit production and supply chain

in Bosnia and Herzegovina. Finally, the paper presents the author's conclusions derived from the performed research.

2. PRODUCTION, CONSUMPTION AND CHARACTERISTICS OF FRUIT AND VEGETABLE PRODUCERS

Consumption of fruit and vegetables is very important for regular and balanced nutrition of the population. Fruit and vegetables available in the market are accessible for most users and consumers. Research into household consumption indicates that fruit (7.4%) and vegetables (9.5%) do not represent a significant item in the expenditures of households in Bosnia and Herzegovina. After analyzing the prices of fruit and vegetables in Bosnia and Herzegovina, it can be concluded that they are lower than those in many neighboring countries, as well as in the EU. However, revenue and purchasing power of consumers are lower, and we can therefore conclude that fruit and vegetables are relatively expensive, especially for the socio-economic groups with low or minimum wages. Daily consumption of fruit is 80-100 grams on average, and the research results show that two thirds of people in Bosnia and Herzegovina consume fruit at least once a day. Consumption of vegetables in Bosnia and Herzegovina is still characterized by high seasonality, with high consumption of fresh perishable vegetables between May and September, and high consumption of nonperishable vegetables during the winter period.

The total production of fresh fruit and vegetables in B&H in 2012 amounted to 150 million KM, of which 40% was sold in the international market. Among the fruit crops the most common are the following: plum, apple, pear, raspberry, strawberry, sweet cherry and forest fruits. Among the vegetable crops, the most common are the following: potato, cabbage, cucumber (industrial cucumber for pickling), tomato, pepper. The most exported are fresh plums, frozen and fresh raspberries, forest fruits, cherries, cucumbers, tomatoes, potatoes, etc. Four products where B&H has a significant surplus in trade with other countries are plum, raspberry, sweet cherry and cucumber (industrial cucumbers for pickling) (USAID/Sida FARMA and et., 2014b, p. 6).

In general, the fruit production in Bosnia and Herzegovina is following a good growth trend and has preconditions for development and improvement. The physical volume of fruit production in Bosnia and Herzegovina is a lower per area unit than in other neighboring countries and EU countries. A positive trait is that Bosnia and Herzegovina has a higher rate of growth in vegetable production than in the neighboring countries, with the exception of Serbia. The growth rate of fruit production in Bosnia and Herzegovina is by 8% higher compared to the world growth rate, which implies that the increase has been directly caused by an increase in cultivable land (FAO, 2012a, p.39).

The areas under vegetables and the total volume of production in Bosnia and Herzegovina is increasing but more slowly than the world trend, and this is the case in other neighboring countries as well, with the exception of Croatia, which recorded positive growth trend in vegetable production. In the fruit production, Croatia is on the

54th position in the world according to the quantity of produced apples, but most of its production is sold on the domestic market. A very small quantity is exported, even though the European countries are the largest importers of apples. The Croatian apple market, just like the market for other fruits and vegetables, is not regulated, but is left to chance and the negotiating power of purchasers-wholesalers and producers. This is the cause of uncertainty of producers and of significantly lower purchasing prices than those that could be achieved in the international market (Bezić, 2011, p. 108).

Table 1: Types and characteristics of fruit and vegetable producers in Bosnia and Herzegovina

Producer type	Main characteristics and investment challenges		
	General	Fruit producers specifics	Vegetable producers specifics
Semi-subsistence producers	Small-scale holdings with no or small surpluses depending on the years and the crops. Mixed farms growing fruits, vegetables, cereals and breeding cattle and pigs or a few sheep. Non-registered, non-Value Added Tax (VAT) payers, informal market channels. Elderly people or part-time. High social vulnerability for young in the household who are without a second job.	Exploit old orchards, with low rate of new orchards. Quickly processing large fruit quantities into syrup and domestic products. Other processed products for self-consumption.	Low level of investments, with some exceptions in the case of tomato, cucumber and pepper production increase. Processed pickles for winter consumption and sometimes for green market sales.
Commercial family farms			
Medium estates	Limited land surface and high fragmentation hinder their production upscale and threaten their holding viability. Low on farm storage capacities. Large portion of these farms are mixed farms including other crops and animal production.	3-5 ha orchards or 0.5-1.5 ha berry fruits. Insufficient quality. Direct selling via middleman at the green markets.	1-5 ha open-field or 0.3-1 ha indoors (greenhouses). Diversified marketing channels, based mostly on farm-gate, green markets and wholesale.
Large estates	Have to establish regular business relations with buyers to sell larger volumes. Single producers are not in position to meet exporters' and larger retailers' requirements in particular in terms of sales volumes. Have not yet reached the threshold in terms of post-harvest management and logistics to satisfy modern supply chain requirements.	5-30 ha orchards or up to 10 ha berry fruits. Good technological level with intensive orchards. High labor costs. Basic and sometimes advanced storage facilities. Supply chain integration, e.g. seedling production and sales, or production of packaging (wooden trays).	5-30 ha of open-field vegetables or 5-10 ha indoors (greenhouses). High harvest labor costs for non-perishable vegetables. Satisfactory agricultural machinery and equipment.
Firms	High labor costs. Financial challenges due to credit reimbursement. Lack of experience in the agricultural sector.	More than 50 ha of orchards. Supply supermarkets and the export market.	Capital and mechanization of intensive production on more than 50 ha areas. Mainly privatized former large companies.

Source: FAO, Regional Office for Europe and Central Asia (2012), The Fruit and Vegetable Sector in Bosnia and Herzegovina, Preparation of IPARD Sector Analyses in Bosnia and Herzegovina, p.30.

In the last ten years, the production of raspberries, apricots, tomatoes, apples and strawberries had the greatest growth in Bosnia and Herzegovina. In the same period, the production of vegetables did not increase significantly, with the exception of tomatoes whose growth amounted to nearly 20%.

Consumption of fruits and vegetables in Bosnia and Herzegovina is characterized by a high consumption of fresh perishable vegetables between May and September and during the year, as well as a high consumption of non-perishable vegetables and winter stores (processed vegetables on the farm) during the winter months. The period of consumption is somewhat prolonged due to the imports of tomatoes and other fresh vegetables.

If we analyze the structure of fruit and vegetable producers in Bosnia and Herzegovina, it can be concluded that four groups and four types of producers can be differentiated, which are shown in Table 1.

From Table 1, certain characteristics typical for Bosnia and Herzegovina can be observed, including that many fruit and vegetable producers are working on mixed farms, where they also grow some crops and raise some livestock.

The import of fruit and vegetables in Bosnia and Herzegovina is mainly done from the neighboring Balkan countries, especially from Croatia, Macedonia and Serbia, and some from Turkey.

The fruit and vegetables export from Bosnia and Herzegovina is mostly directed to the neighboring countries, as well as to Austria, France, Germany, Russia, Turkey and Sweden. The exports have been mainly based on obtained Global GAP certificates, which meet EU market standards. Export is formally organized through companies that have the necessary permits and certificates and through partner EU companies.

3. VALUE CHAIN OF FRUIT AND VEGETABLES - LITERATURE REVIEW

The value chain consists of all members of the supply chain involved in the process of value creation and delivery of products to the end customers. Trade must have good and high-quality relations within the supply channel, which will result in added value for the end customer. This is the source of competitive advantage in the market. In order to strengthen their competitiveness, the members of the value chains create closer ties by entering into partnerships in which they do not lose their autonomy, i.e. they create strategic alliances.

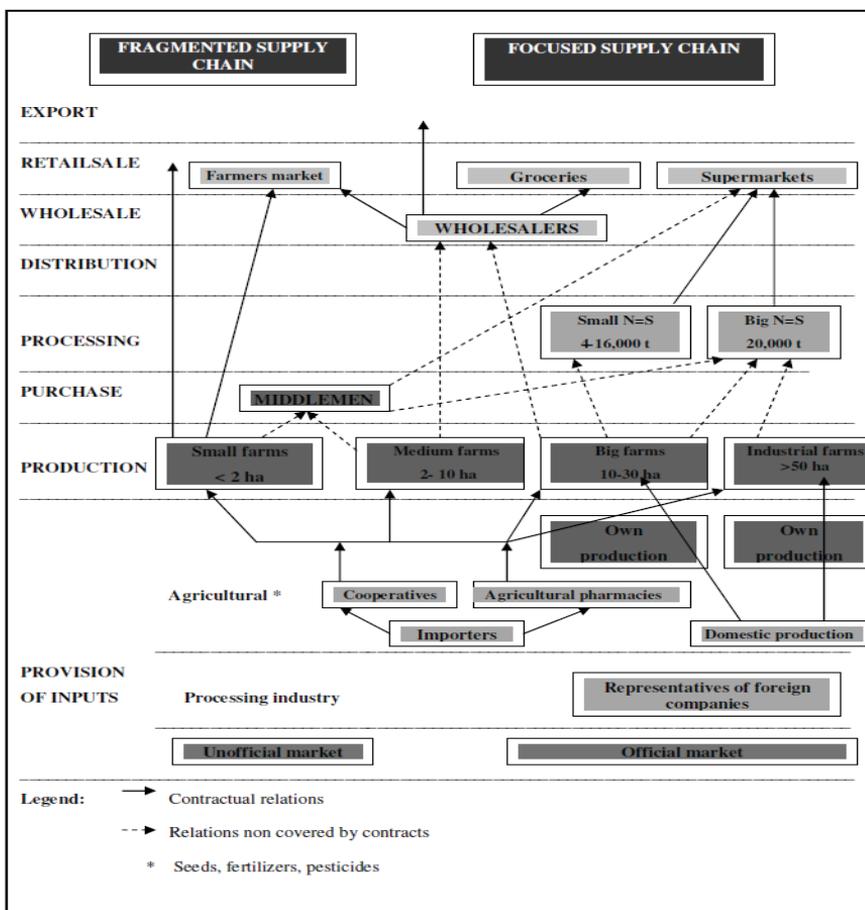
The process of value chain creation represents the sequencing of activities, so that they can be integrated into the value of the products or services.

The value chain identifies the primary activities and supporting activities. It defines a set of related activities that are performed within a single business unit. Each activity creates the costs and connections of certain activities. The value chain includes the operating profit, which consumers are willing to pay above the costs of performing both groups of activities (Kaličanin, 2005, p.279).

The value chain is a series of primary and supporting activities that adds value to products or services, i.e. it connects the supply side with the demand side of the entrepreneur’s business. This is why the creation of a profitable value chain requires harmonization of changes in customer’s wishes, i.e. of the demand chain and what is created in the supply chain. In order that the supply chains achieve maximal value, it is necessary to harmonize the flow of supply with the flow of consumers’ value, due to rapid changes in tastes, desires and requirements of customers (Perkov & Čosić, 2012, p. 137).

The value chain of fruit and vegetables has its own specific features due to the characteristics and types of fruit and vegetables. Production of fruit and vegetables is

Figure 1: The value chain of fruit and vegetables in Bosnia and Herzegovina



Source: Federal Ministry of Agriculture, Water management and Forestry of the Federation of Bosnia and Herzegovina (2014), Strategy of the Competitiveness Increase and Attraction of Investments into the Value Chains of Milk and Dairy Products as well as Fruits and Vegetables in the Federation of Bosnia and Herzegovina, p. 38.

very important because rural farms are ensuring food security (primarily by vegetables) and income (primarily by fruit). Most of the fruit and vegetable products in Bosnia and Herzegovina are offered at local markets or wholesale markets. This is primarily due to the absence of long-term contractual relations with processors/traders, lack of facilities for storage and organized logistics, low level of the achieved price, which does not enable investments into modern production technologies that could ensure sufficient quantities of high-quality marketable products, and which could be integrated into the existing value chains (FMPVŠ FBiH, 2014a, p.39).

Figure 1 shows the value chain of fruit and vegetables which is dominant in Bosnia and Herzegovina.

As can be seen in Figure 1, which shows the value chain of fruit and vegetables in Bosnia and Herzegovina, inputs for production are mainly imported and sold through a network of contracted dealers, agricultural pharmacies and cooperatives. A green list helps farmers find out which products can be used and who is authorized for imports. Some of the planting materials are of domestic origin, while equipment and irrigation systems are entirely imported. In certain cases, there are problems of unknown or inadequate quality of planting materials due to the lack of control of imports and quality, and this results in prices that are not always in line with the quality.

Production of fruit and vegetables is very important because it ensures food security to farms (primarily vegetables), as well as revenue (primarily fruits).

It is obvious that the small farms represented in the value chain mostly work for themselves and have numerous problems. Most of their products are offered on local markets due to the lack of long-term contractual relationships with processors/traders, the lack of storage capacities and organized logistics. The low level of achieved sales price for farmers' products does not allow investments into modern production technologies which could ensure sufficient quantities of high-quality products that could be marketed and integrated into existing value chains. One of the problems, among many others, is the lack of skills and knowledge for identification of market needs, as well as adaptation of products to the market requirements (Savic et al, 2014).

Medium-size producers in Bosnia and Herzegovina (Figure 1.) oriented to the market (2-10 hectares), which usually constitutes the main framework for the development of fruit and vegetable sector, are not present in significant numbers in competing countries, but they have, to a certain extent, developed a better participation in the value chain through contractual relationships with intermediaries. However, they primarily lack the capacities for storage, equipment and human resources. In addition, there are several large farms and corporate companies with better machinery and equipment, human resources and marketing activities. These farms are supplying the supermarkets and they are exporting part of their production.

Vegetable production in Bosnia and Herzegovina had a noticeable negative trend in terms of sown areas for all major crops. Decreased interest in growing vegetables is primarily the result of the lack of subsidies at all administrative levels, as well as of insufficient competitiveness of domestic production compared with imported vegetables

due to low productivity, which is also one of the main problems in this sector. In recent years, there has been increased interest of domestic producers for the production of vegetables indoors (greenhouses).

In contrast to the vegetable production, fruit production in Bosnia and Herzegovina is characterized by an increased number of productive trees for all kinds of fruits and planted areas under raspberries, while the area planted under strawberries has decreased. The highest level of increase in production was recorded in the production of plums, apricots and apples, while the decrease in production was recorded in production of pears and sweet cherries.

The collection of fruits and vegetables (from small farms) is mainly performed via traders-intermediaries, while big producers are directly supplying the processors or wholesalers, as well as the supermarket chains.

The main problems in the collection process are the following (FMPVŠ FBiH, 2014b, p. 39):

- lack of modern storage facilities,
- lack of modern distribution centers with modern technology for processing and
- standardization of supplied products,
- inadequate transport due to the lack of adequate transport facilities and undeveloped roads,
- high collection costs due to the dispersed locations of small farms,
- the presence of “gray economy“.

There are rare exceptions that have managed to overcome major problems and to organize the supply chain in a way that meets customers' requirements in terms of the insured amounts and quality. Generally, the processing companies are not vertically integrated. In terms of the supply of inputs, some of them have contractual relationships with small farmers, while in terms of retail sales, they usually do not have their own retail stores and their bargaining power against the large retail chains is generally low, especially in a situation of strong competition from neighboring countries.

In addition, the processors are faced with the following problems (FMPVŠ FBiH, 2014c, p. 40):

- inadequate quality and quantity of domestic inputs,
- outdated technology,
- low rate of capacity utilization,
- rising input costs,
- high rate of organic waste and increasing requirements for the protection of the natural environment,

- limited and traditional assortment - 'primary' processing prevails,
- limited marketing activities and promotions.

Although the big trade chains are dominant on the market, their participation in the trade of fruit and vegetables is still relatively low (about 10%) and it is lower than in the trade of meat and meat products, fish or milk and dairy products. Big trade chains have a more important market share in the case of processed fruit and vegetables, but domestic producers are under-represented. The reason for this is the domination of imported products that represent a strong competition to the producers from Bosnia and Herzegovina (FMPVŠ FBiH, 2014c, p.40).

4. SUPPLY CHAIN OF FRUIT AND VEGETABLES

Supply chain management is defined as the integration of business processes among all members of the chain, with the aim of achieving a better performance of the entire chain. Performance, i.e. the effect of the chain or the value that has been realized, is the indicator that all members of the chain are trying to "achieve". The supply chain management is inseparable from the value chain management.

The supply chain consists of a set of institutions that are involved in the transfer of goods from the point of production to the point of consumption. The retail sale is the final link in the supply chain. Successful supply chain management will result in significant savings and increased customer satisfaction. Retail sale is responsible for equalizing individual needs of customers with the amount of supplies produced by a huge number of producers (Plazibat, Brajević, 2009, p. 135).

The generally accepted and widespread concept of supply chain management reflects a contemporary form of logistics network, made up of suppliers, producers, warehouses, distribution centers and retail stores (Dunković, 2010, p. 1).

The efficient functioning of the supply chain assumes the participation and support of many entities, which are located between producers and consumers, including state support in order to enable the products to find their way to end users without difficulty. It primarily concerns various forms of transport, freight forwarding, warehousing, insurance, marketing, wholesale, retail and other specialized organizations, which should contribute to overcoming the spatial and temporal gap between producers and consumers through mutual cooperation (Malinić, Janković, 2011, p. 11).

The first step in the establishment of the supply chain in the agroindustry is the analysis of the existing system of trade and environment (product flows, trade level, governmental policies and other circumstances), aimed at identifying the factors that are critical for the success of the supply chain. This includes the implementation of a SWOT analysis in order to identify strengths and weaknesses of potential supply chain, but also the possible threats and opportunities that exist in the environment. Based on the information resulting from the above analysis, potential participants make the decision whether they will enter the supply chain. If they decide to par-

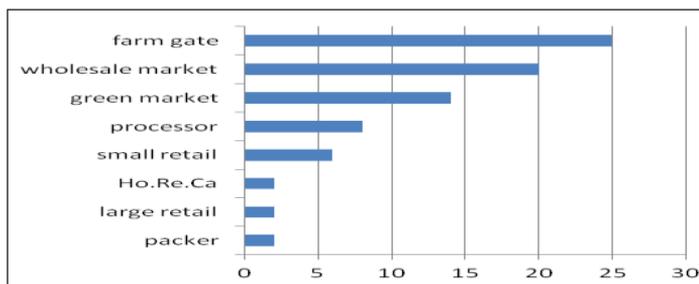
ticipate, then they define their roles, functions and relationships in the supply chain (Rockel et al, 2002, p. 7).

The supply chain of fruit and vegetables has its own peculiarities. In general, the supply chain of fruit and vegetables in Bosnia and Herzegovina is relatively short and ends at the local markets or in the neighborhood. In the case of longer supply chains, producers remain fairly passive and they don't have signed agreements with traders, because they usually sell their products to intermediaries on the farm gates or at wholesale markets. It is a challenge for decision makers of the economic and trade policy measures to create such a business environment that would include small producers into the longer supply chain in the fruit and vegetable sector. These characteristics of the supply chain are typical for countries in transition, where the organization of the market and the legal framework are changing rapidly. The changes include new points of sale and distribution (supermarkets and specialized fruit and vegetable stores), the establishment of highly demanding security measures, as well as the establishment of a legal framework and modernization of agricultural and food processing firms. These transitional processes are often spontaneous and not controlled by the policy makers (FAO, 2012b, p. 39).

The big problem of fruit and vegetable producers in Bosnia and Herzegovina is a low level of income. The income of the fruit and vegetable producers in Bosnia and Herzegovina is significantly lower in comparison with the same producers in the EU. It could also be a competitive advantage of B&H producers, since their cost of labor is lower.

There are still a number of problems in the production of fruit and vegetables in Bosnia and Herzegovina, which are reflected in the low vertical integration in the supply chain, and in insufficient storage and processing capacities that are outdated, inadequately located and not owned by the producers themselves. The next problem is the underdeveloped process of collection, classification, storage and transport of fruit and vegetables in Bosnia and Herzegovina. One of the ways for solving the above-mentioned problems is the adoption of new knowledge and new technologies in supply chains in the fruit and vegetables sector, as well as connection and integration with large international trade supply chains.

Figure 2: Selling places for fruit in Bosnia and Herzegovina



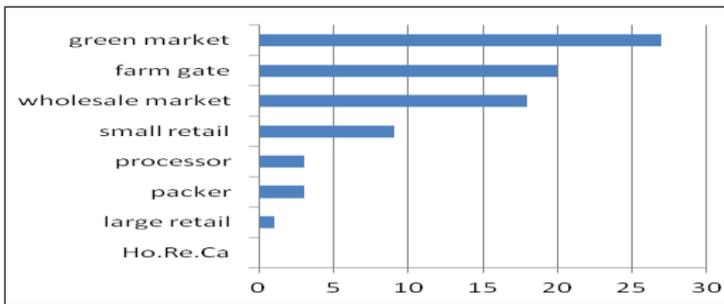
Source: FAO, Regional Office for Europe and Central Asia (2012), The Fruit and Vegetable Sector in Bosnia and Herzegovina, Preparation of IPARD Sector Analyses in Bosnia and Herzegovina, p. 42.

What should be noted is the fact that wholesale markets play a key role in the supply chain, since most supermarkets and retailers are supplied at wholesale markets. Figure 2 presents the selling places for fruits in Bosnia and Herzegovina.

It can be seen in Figure 2 that fruit is mostly sold on farms (about 25%), followed by wholesale markets (about 20%), green markets (below 15%), then for processing (less than 10%), while just over 5% is sold in small retail shops. About 3% of fruit is sold respectively for catering, great shops and packing facilities.

Figure 3 shows the selling places for vegetables in Bosnia and Herzegovina.

Figure 3: Selling places for vegetables in Bosnia and Herzegovina



Source: FAO, Regional Office for Europe and Central Asia (2012), The Fruit and Vegetable Sector in Bosnia and Herzegovina, Preparation of IPARD Sector Analyses in Bosnia and Herzegovina, p. 43.

Figure 3 shows that most vegetables is sold on the green markets (about 27%), followed by farms (about 20%), wholesale markets (about 18%), small retail shops (under 10%), then for processing (less than 5%), while less than 5% is sold in the packing facilities. About 2% is sold in large stores.

The supply chain of fruit and vegetables is characterized by a great diversity and numerous special features. Changes are a special characteristic of the supply chain of fruit and vegetables, and are primarily determined by demand of the consumers and supermarkets. Demand is determined by the perception and changes in consumers, due to the growth of specific ways of growing fruit and vegetable. This perception and changes in consumers are reflected in (FAO, 2012c, p. 44):

1. Increased orientation toward safety and quality proven through certified quality standards (Organic, Global GAP, HACCP, Halal...).
2. Creation of a platform for the associations of fruit and vegetable producers and contracts with supermarkets they should supply.
3. Advancement of technology in order to ensure adequate storage, as well as improvement of packaging.

When we talk about improving the supply chain management of fruits and vegetables in B&H, it should be noted that there are two main challenges in establishing an efficient supply chain. The first is how to involve small producers in the modern supply chain, since they are largely uncompetitive, working and functioning on their own and cannot provide the required standards. The second is how to increase the competitiveness of the fruit and vegetable production in order to penetrate new markets and subsequently increase the demand for fruit and vegetables.

One of the ways of improving the fruit and vegetable supply chain should be an introduction and application of the so-called converged technologies, in particular nanotechnologies, especially in the final phase of the production process (packaging of fruits and vegetables). At the moment, numerous nanotechnology platforms are developing in the world, as an application support in the food production chain including the fruit and vegetables production chain (Organization for Economic Co-operation and Development, 2014, p. 27.)

In the food production chain, nanotechnology can be applied within three sub-categories:

1. agricultural production,
2. food processing,
3. packaging and distribution (Organization for Economic Co-operation and Development, 2014, p. 28.).

This would allow the farmers closer monitoring of environmental conditions in fruit and vegetable production, and give the opportunity (in terms of “precision” agriculture) for early intervention in unfavorable situations.

5. PRODUCTION AND SUPPLY CHAIN OF STONE FRUIT IN BOSNIA AND HERZEGOVINA

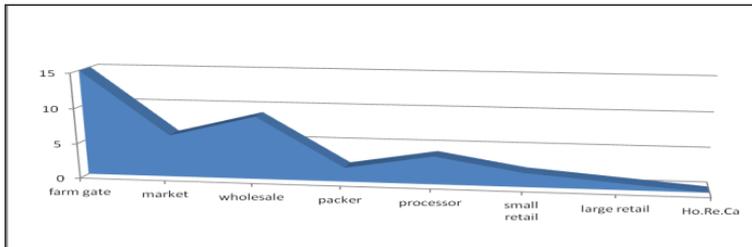
Stone fruits are the most dominant fruits in the overall structure of fruit production. Traditional production of plums excels in the field of production of stone fruits. Other stone fruits are somewhat less common in the B&H production. However, low production per area unit is characteristic, which is compensated by large areas and number of trees. The average production of stone fruits in B&H is around 150-200 thousand tons. The yield of stone fruits are mostly constant with relatively slight variations, in particular in comparison with other groups of fruits and vegetables. These data relativize the situation and do not show quite a realistic picture of the situation and trends taking place in Bosnia and Herzegovina. The real picture is the existence of duality, i.e. on the one hand there are relatively large areas of extensive orchards, while on the other hand plantations on larger areas with new technologies of cultivation are represented.

It is characteristic for Bosnia and Herzegovina that the producers give up the traditional varieties of plums intended for the production of brandy and dried prunes. New varieties intended for the market as fresh fruit are dominant in new orchards, such

as e.g. Čačanska *ljepotica* (Cacak Beauty), Čačanska *najbolja* (Cacak Best), Čačanska *rana* (Cacak Early), Hanita etc. The same trends are also occurring in the production of sweet cherries. Changes in the acceptance of new technologies in recent years resulted in significant positive trends in the production and trade of stone fruits, especially plums and sweet cherries. The rate of production growth is significantly higher than the world one. Only Serbia has a higher rate of growth, while Croatia and the CEFTA 2006 member states are also experiencing positive growth trends, albeit slower than Bosnia and Herzegovina. Over 85% of stone fruits produced in Bosnia and Herzegovina are plums. In Bosnia and Herzegovina there are around 75,000 hectares under plum orchards, which accounts for about 60% of the total area under fruits. Fruit production should be one of the most intensive productions for the achievement of greatest productivity per unit area. However, in Bosnia and Herzegovina large proportion of traditional plum orchards prevail in the total production and because of this the value added per hectare remains at low level in Bosnia and Herzegovina (FAO, 2012d, p. 98).

In the last decade, there has been an upward trend in the production of plums, but this is primarily due to increased world demand for plums, opening borders for duty-free exports, investments into processing and drying facilities for plums. The plum producers in Bosnia and Herzegovina are obviously following the changes in the technology of breeding plums. As a result, more and more modern plantations with table varieties are appearing. Figure 4 presents the selling places where the biggest quantities of plums are sold in Bosnia and Herzegovina.

Figure 4: Selling places for plums in Bosnia and Herzegovina



Source: FAO, Regional Office for Europe and Central Asia (2012), The Fruit and Vegetable Sector in Bosnia and Herzegovina, Preparation of IPARD Sector Analyses in Bosnia and Herzegovina, p. 100.

In Bosnia and Herzegovina (Figure 4) the highest sale of plums is on the farm (about 15%), followed by sales at wholesale markets (less than 10%), while other selling places are less represented and are at the level of about 5% or less (shopping centers, packing facilities, processors, small retail shops, large retail shops and catering).

Other stone fruits also have an increased production trend in Bosnia and Herzegovina, but their production is less significant. The most important among stone fruits

is sweet cherry (6% share in total production of stone fruits), followed by peach and nectarine which are also recording a significant growth in production. The highest growth in production, area and export is recorded for apricot, but its share in total production and area is very small. The value of exports of stone fruits has increased significantly in the last decade, mainly thanks to the export of plums. The increase in exports has been recorded in the case of apricot, while the largest decline in exports has been recorded for peaches and nectarines which, despite the decline, remained the second export product among stone fruits according to export value. Bosnia and Herzegovina recorded a positive growth of stone fruits export compared to the world average, but it was significantly lower than the growth rate of exports of Serbia, Croatia or an average of the CEFTA 2006 member states group. Over 90% of exported stone fruits have been exported in fresh condition, which is more than in competing countries, Serbia (about 80%) and Croatia (about 30%). Export of plums in the total exports of stone fruits is over 61%, while export of peaches and nectarines (almost 25%) takes the second place. Over 30% of produced peaches have been exported, mostly to Serbia and Slovenia.

In the case of imports of stone fruits into Bosnia and Herzegovina, import of sour cherries for the processing industry is dominant, followed by peaches, nectarines and sweet cherries, which are imported fresh.

The increase in exports is the result of newly opened markets such as the Russian and the West European (for those companies that have a certificate according to the Global GAP standard), as well as several processing facilities that organize their own supply chain based on production in CEFTA 2006 member countries.

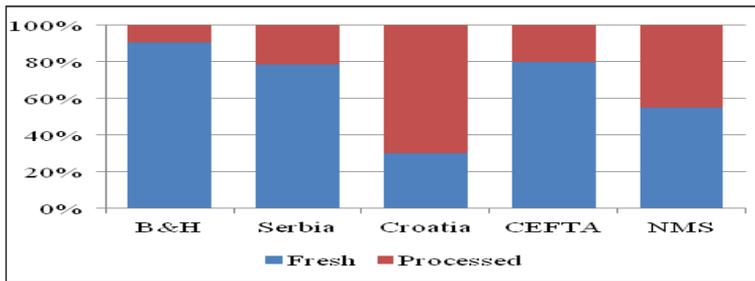
One can distinguish three characteristic supply chains in the production and trade of stone fruits in Bosnia and Herzegovina (FAO, 2012e, p.99):

1. The supply chain which ends on-farm or in the local market. This is the most common supply chain; it is made up of the largest number of small producers who have tens to hundreds of stone fruit trees and who have primarily converted their fruit into brandy or other processed fruit products. Only a part of these products are sold, but the majority is spent on-farm or in the local market.
2. Export-oriented supply chain for fresh products. This is the supply chain which shows the highest growth. It is driven by quality and assortment, which are mainly represented among the producers who have plantations over one hectare. The key for this supply chain is the proper maintenance of orchards and assortment that goes in the direction of achieving the highest price for early varieties. In plum production, profit can be achieved if the assortment is adapted to the requirements of the market and the period of maturation (early varieties). One of the problems encountered by this supply chain is the lack of cooling capacities and poor geographical distribution of cooling capacities designed to prepare the products for transportation.
3. The third supply chain is the purchase of fruit for processing (drying, freezing, brandy making, jam making). Due to an increase in domestic consumption

and obtaining of preferential status for export to EU countries by Western Balkans countries, as well as the Serbian agreement with the Russian Federation, there have been increased investments in processing facilities for stone fruits, especially for dried prunes and brandy, but also for other products. In this supply chain, the fruits are of poor quality. However, through processing, this supply chain generally increases the value of products made from stone fruit.

Figure 5 presents the export of fresh and processed stone fruits from Bosnia and Herzegovina.

Figure 5: Export of fresh and processed stone fruit from Bosnia and Herzegovina (%)



Source: FAO, Regional Office for Europe and Central Asia (2012), The Fruit and Vegetable Sector in Bosnia and Herzegovina, Preparation of IPARD Sector Analyses in Bosnia and Herzegovina, p. 100.

Figure 5 shows the structure of stone fruit export and the division of export between fresh and processed products. For example, nearly 80% of the stone fruit has been exported to Serbia in fresh state and slightly more than 20% in processed state. Around 25% of stone fruit is exported to Croatia in fresh state and around 75% in processed state. Bosnia and Herzegovina exports to the CEFTA 2006 member countries about 80% of stone fruit in fresh state and about 20% in processed state. Bosnia and Herzegovina exports to the new EU member states (NMS) slightly less than 60% of stone fruits in fresh state and slightly more than 40% in processed state.

6. FORMATION OF STRATEGIC ALLIANCES IN THE FUNCTION OF FRUIT AND VEGETABLE VALUE CHAIN INCREASE

One of the ways of achieving the volume of retail trade is by joining, i.e. forming strategic alliances of agricultural producers. Strategic alliances are cooperation agreements between two or more enterprises or farms which jointly develop a strategy whose

result must be synergy, otherwise it does not make sense. The alliances are based on the relationship of reciprocity, where each partner is willing to share a specific ability with others and where all parties are ready to invest, finance and risk the funds for the common good, i.e. for the realization of a common advantage and synergetic effect.

For retail trade of agricultural products and consequently fruits and vegetables, classification of strategic alliances according to the direction of cooperation is significant. Due to the way of cooperation, strategic alliances are classified as horizontal, vertical and diagonal strategic alliances (Gomes-Casseres, B., 2003, p. 328)

Horizontal strategic alliances are those of direct competitors. What characterizes this type of association is the possibility of losing its own competitive advantage, i.e. opportunistic behavior of partners.

Vertical strategic alliance is made up of associations of companies in the value creation chain. This is a very common type of the supply chain alliance, because of the tendency to reduce costs in the distribution chain and create partnerships between customer and supplier (Chun-Wei R. L., Hong-Yi S. C., 2004, p. 163.)

Diagonal strategic alliances are those of the partners from two different industries.

Vertical strategic alliances are typical for retail trade with agricultural products (fruits and vegetables). Vertical strategic alliances are the alliances of participants in distribution channels, i.e. the alliance of customers and suppliers, or of buyers and producers, or of the producer and suppliers. Therefore, all combinations of the participants within a value chain are possible.

Vertical strategic alliances allow the coordination of costs, which is extremely important to farmers due to technological innovations and foreign competition of cheaper agricultural and food products. They could achieve cost effectiveness by specialization and competition in the areas at the same level (Tipurić, Markulin, 2002., p. 90)

Strategic alliances within the value chain of fruits and vegetables are established in order to operate with minimal inventories, achieve sales promotion, reduction in the price of finished products, reduction of costs and delivery times, increase in product traceability, etc. This is extremely important for agricultural products, mostly those which have a shorter expiration date, and where the fruits and vegetables have been classified as well.

The effect of alliances may not be valuable to the same extent for the retailer and for the farmers, but their individual desired values are inseparable. The difference in value derives from the specificity of the agreed relationship or simply from the situation that each partner is facing.

The innovation in the supply chain management of agricultural products is contract farming. Contract farming is a form of vertical connection of characteristic for the agricultural product chain. Through contract farming, an enterprise has a greater control over the production process, as well as the quantity, quality, characteristics of the product and the required period of production. By integrating through contract

farming, an exception from the classic operations has been made, allowing the company a certain degree of control over the production process without direct interference/entry into production itself (Prowose, M., 2012, p. 9).

The value chain is linked through a vertical partnership of farmers/suppliers and trade, and relates to the optimization of inventory management as well as the logistic concept within the efficient consumer response (ECR) in order to take advantage of synergy effects that are in the focus of the strategic linking through the strategic alliance. The synergistic effects would be reflected in the benefits for all partners, traders and farmers, i.e. the suppliers in an increase of efficiency and reduction of costs.

Farmers (producers of fruits and vegetables) have to take into account the trend in the European Union but also in their own region concerning connections between retailers. Retailers usually enter the so-called *buying groups* of the strategic alliances' type (i.e. the buying groups), which means that the basic motive of associations are better purchasing conditions, i.e. strengthening of their own bargaining power against the suppliers. In the case of European companies (*the buying groups*), strategic alliances of retail trade that primarily create a critical mass for economies of scale and reduce logistics and distribution costs by managing the supply chain, create a competitive force of the group in relation to their market opponents (Balan, C, 2007. p. 30).

7. CONCLUSION

In the supply chain, true added (final) value is realized only when the whole chain is moved closer to the buyer.

Challenges in creating a value essentially include achieving faster execution of a process, e.g. faster adjustment of a product, faster placement on the market, faster payment and so on. It is necessary to rationalize the process within the chain, achieve the quality of a product and make delivery efficient. Essentially this means that a focus is needed on challenges such as: reduction of inventories, appropriate response to the order, shorter and reliable delivery within the entire chain, products delivered based on the right quantity postulate - the right quality, at the right time, at appropriate cost, as well as close cooperation and connection of all chain members based on mutual understanding.

Creating value cannot be realized neither individually nor independently within the chain. Creating value is a two-way process, which requires all members to focus and make decisions about cooperation and coexistence within the chain, based on a strategy which is best for them all and an agreement about what exactly they should exchange.

Bosnia and Herzegovina has sufficient preconditions - a long tradition, appropriate climate conditions, favorable trade links and growing demand, to produce favorable trends in the production and trade of fruit and vegetables.

In the fruit and vegetable production a dualism is present, which is reflected in the prevalence of small farms producing for their own consumption and farms that produce for the market.

An increase of the value chain could be achieved through the certification of fruit and vegetable production as integral production. The certification of fruit and vegetable production as integral one can be achieved without major investments and significant changes in the mode of production. The fruit and vegetable producers have to accept the changes required by the European market.

Market standards are not regulated by the state, but in practice they are developed in cooperation between primary producers and processors of fruit and vegetables. Therefore, these standards started to be adopted by a very limited number of producers. These are mostly the Global GAP standard (in primary production) and HACCP standard (in the processing industry). There is also an increase in certification according to the HALAL standard.

The supply chain for food products is of great importance both for the overall economic sector of food products and for agriculture and rural areas. The logistics concept is decisive for the choice of new locations for food processing industry and central warehouses. Fresh agricultural products are often produced contractually (between the producers and the processors) in a way that processors control the sowing and take over the harvest. Short routes and logistics that is aligned with the time of harvest are useful. Likewise, e.g. the fruit and vegetable processing industry prefers to process fresh products as soon as possible in order to minimize the loss of valuable content and to minimize the damage from the loss of taste. Short paths between sowing (harvest) and processing are therefore useful (Segetlija, 2009, p. 86).

The supply chain of fruits and vegetables is characterized by the fact that farmers mostly sell their products at the entrances to the farm, on green markets and wholesale markets, while the sales to large retail chains is less represented and in amounts below 10%.

The current situation in Bosnia and Herzegovina is characterized by high competition at the level of primary fruit and vegetable products and low competition at the processing level. This is primarily due to a low interest of investors, inability to be achieved the EU standards for large groups of products, inadequate support policy and the lack of institutional support.

Horizontal and vertical linking and pooling is underdeveloped, but there are a number of cooperatives and associations that are not always enabling easier and better achievement of objectives in the fruit and vegetable production. For the functioning of the fruits and vegetables supply chain in Bosnia and Herzegovina, the vertical and horizontal connection is important. There is an increasing need for producers to meet the requirements and regulations of the market, which will be bigger and more complex in the future.

Measures for support of the fruit and vegetable production should monitor the producers in terms of better understanding and meeting the market quality requirements, including requirements for the protection of the environment and for biodiversity, but also for the preservation of traditional values in production.

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ANALIZA VRIJEDNOSNIH LANACA ZA PRODAJU VOĆA I POVRĆA

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Sažetak

Poljoprivredni proizvodi se kupuju za osobne potrošnje ili kao sredstvo za daljnju proizvodnju.

Voće i povrće su važan sektor poljoprivredne proizvodnje Bosne i Hercegovine, jer opskrbljuje stanovništvo dostatnom hranom a ruralna gospodarstva zaradom. U Bosni i Hercegovini je opskrbeni lanac tržišta voća i povrća kratak što znači da se proizvodi prodaju u blizini mjesta proizvodnje ili na lokalnim tržištima. Duži lanci opskrbe na tržištu nisu u tolikoj mjeri zastupljeni zbog pasivnosti proizvođača i nepostojanja ugovorne suradnje sa trgovcima na veliko i malo.

Osnovni cilj ovoga rada je identificiranje i analiza proizvodnje i prodaje voća i povrća u BiH, te prijedlog primjene suvremenih menadžerskih metoda u cilju poboljšanja njihova lanca opskrbe. Podaci za ovo istraživanje prikupljeni su pomoću anketnog upitnika upućenog poljoprivrednim proizvođačima (primarnih izvora informacija), kao i analizom sekundarnih izvora podataka (znanstvene i stručne literature, podaci službene statistike). Pri istraživanju koristile su se slijedeće metode: metoda anketiranja, metoda analize i sinteze, metoda deskripcije i metoda uspoređivanja.

Kao izazov u upravljanju i uspostave učinkovitijeg tržišnog lanca, postavlja se pitanje kako uključiti male proizvođače u suvremene tržišne lance.

Ključne riječi: *proizvodnja voća i povrća, lanac vrijednosti, lanac opskrbe, distribucija voća i povrća.*

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